

NASA TECH BRIEF



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Aluminum Core Structures Brazed Without Use of Flux

The problem:

To devise methods of brazing aluminum alloy face sheets to aluminum alloy honeycomb cores without the use of corrosive flux.

The solution:

Use the methods described below.

How it's done:

Method No. 1: A commercially available brazing alloy in the form of powder or foil is pressed or rolled between two 0.0005-inch-thick aluminum films. These film laminates are then placed between the aluminum alloy honeycomb core and face sheets, and the assembly is subjected to brazing. As an alternative, the brazing alloy may be pressed between only one film and each aluminum alloy face sheet. It is desirable to mix aluminum powder or wire mesh with certain brazing alloys. The effectiveness of zinc-aluminum brazing alloys (e.g., 85Zn-15Al or 60Zn-40Al) is improved by the addition of 0.1 percent beryllium. (The alloys with the beryllium additive are not commercially available.)

Method No. 2: The undersides of the aluminum alloy face sheets are coated with a suspension of 200-mesh magnesium powder in alcohol or in an acrylic binder, using the equivalent of not more than 2 to 3 grams of powder per square foot of surface. The addition of colloidal silica will facilitate spreading of the suspension. The brazing alloy is then placed between the coated surface and the aluminum alloy honeycomb core.

Method No. 3: Powdered brazing alloy, with or without the addition of magnesium powder, is bonded to the aluminum alloy face sheets by flame spraying (combustion metallizing, plasma jet metallizing). The face sheets can then be brazed to the honeycomb cores.

The assembled cores and face sheets sandwiched with the brazing alloys are placed in a steel retort, which is then purged and backfilled with inert gas at a pressure of 1 to 2 psi below that of the atmosphere. The retort and contents are heated to the melting point of the brazing alloy used. On completion of the brazing process, the honeycomb structure is aged at the temperature recommended for the particular aluminum alloy used, to produce an undistorted structure having the high-strength characteristics of heat-treated aluminum alloys.

Notes:

1. A stronger honeycomb structure can be produced by interleaving brazing alloy foil at the core nodes during core fabrication. Then, when the nodes are resistance welded together, the foil allows lower power settings and ensures stronger joints on completion of subsequent core-to-face brazing operations.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B66-10360

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Aeronca Manufacturing Corporation
under contract to
Marshall Space Flight Center
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